

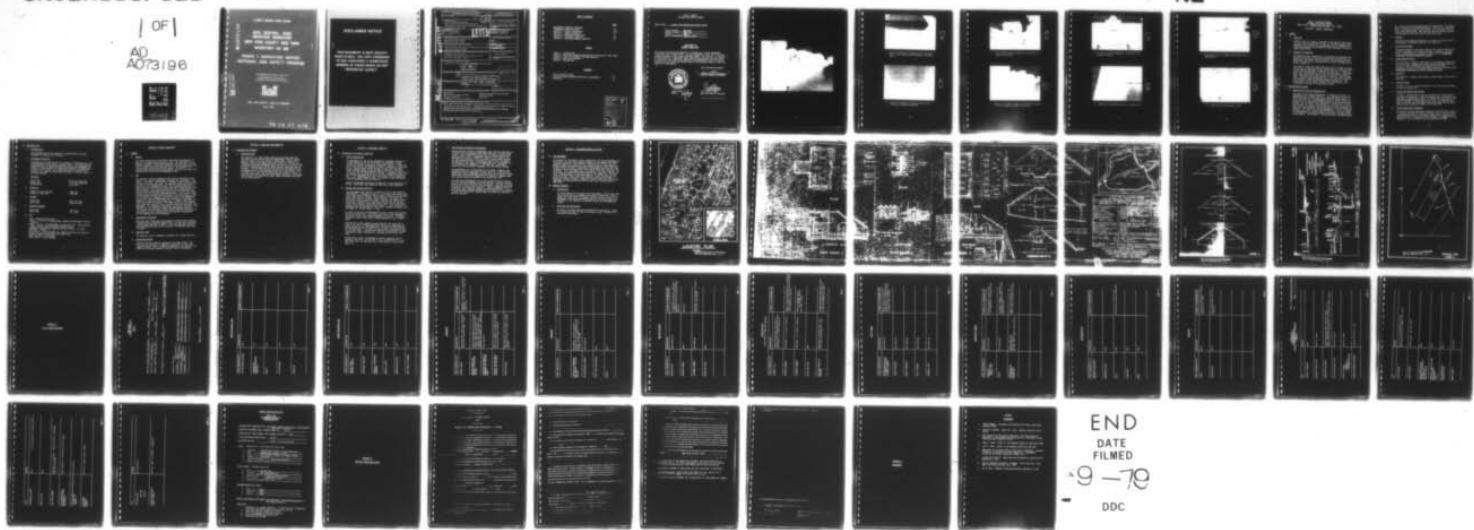
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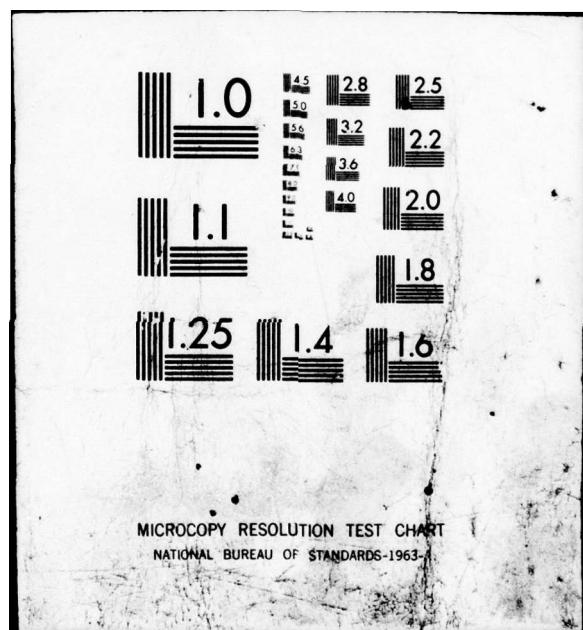
NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/2
NATIONAL DAM SAFETY PROGRAM. NEW CENTRAL PARK RECEIVING RESERVO--ETC(U)
JUL 78 J B STETSON
DACP51-78-C-0035

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LOWER HUDSON RIVER BASIN

ADA073196

NEW CENTRAL PARK
RECEIVING RESERVOIR

NEW YORK COUNTY NEW YORK
INVENTORY NO 188

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

APPROVED FOR PUBLIC RELEASE;
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NEW YORK DISTRICT CORPS OF ENGINEERS
JULY 1978

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM	
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER	
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11. CONTROLLING OFFICE NAME AND ADDRESS New York State Department of Environmental Conservation/ 50 Wolf Road Albany, New York 12233		12. REPORT DATE 28 July 1978	
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. Central Park Receiving Reservoir was found in good condition, although some maintenance actions were suggested.			

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APPENDIX

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- References

A
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PHASE I REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam Central Park Receiving Reservoir NY133

State Located New York
County Located New York
Stream None
Date of Inspection June 22, 1978

ASSESSMENT OF
GENERAL CONDITIONS

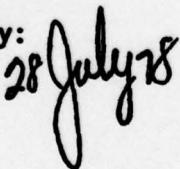
The Central Park Receiving Reservoir is located on a perched embankment in New York City's Central Park. The main embankment areas are to the east along 5th Avenue and the south along 85th Street. The reservoir is generally in good condition. Some minor areas requiring maintenance have been noted. In particular, the large trees growing on the embankment should be removed and the sink hole along the service road in the northeast corner of the site should be investigated.

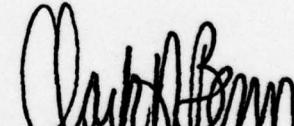
Dale Engineering Company

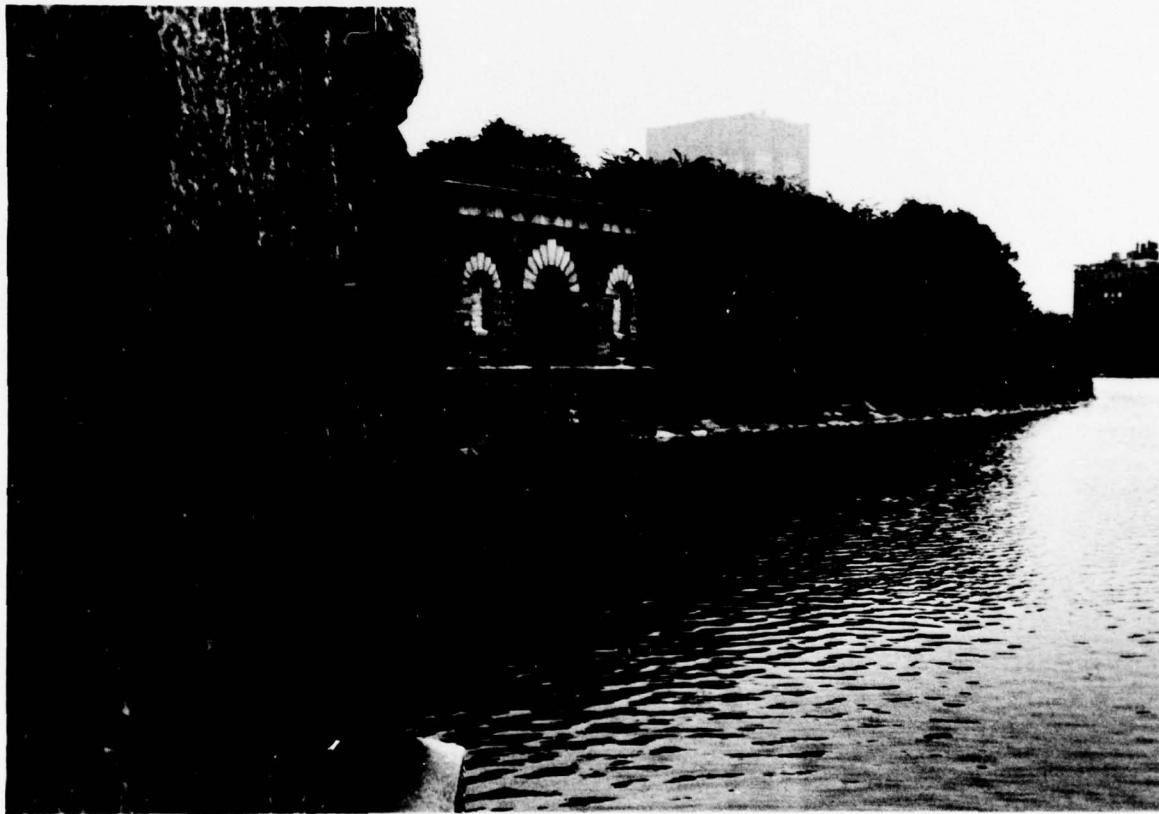

John B. Stetson, President

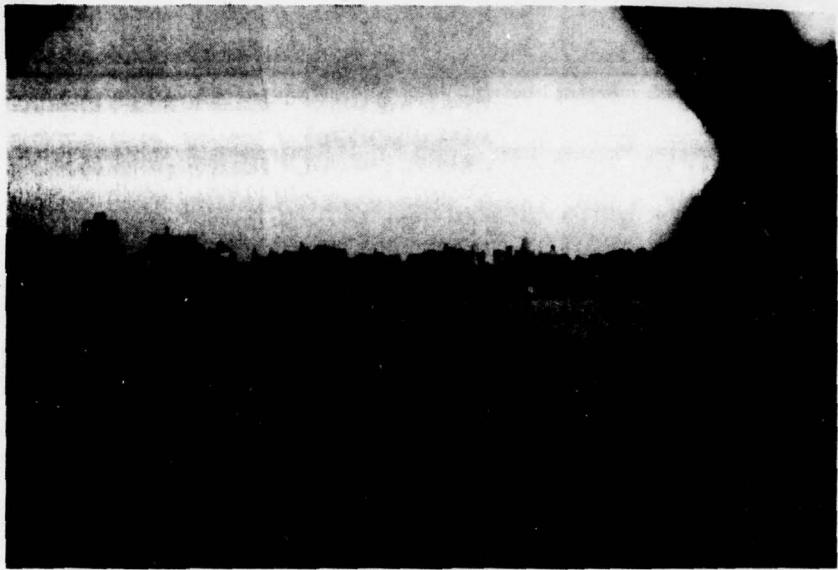


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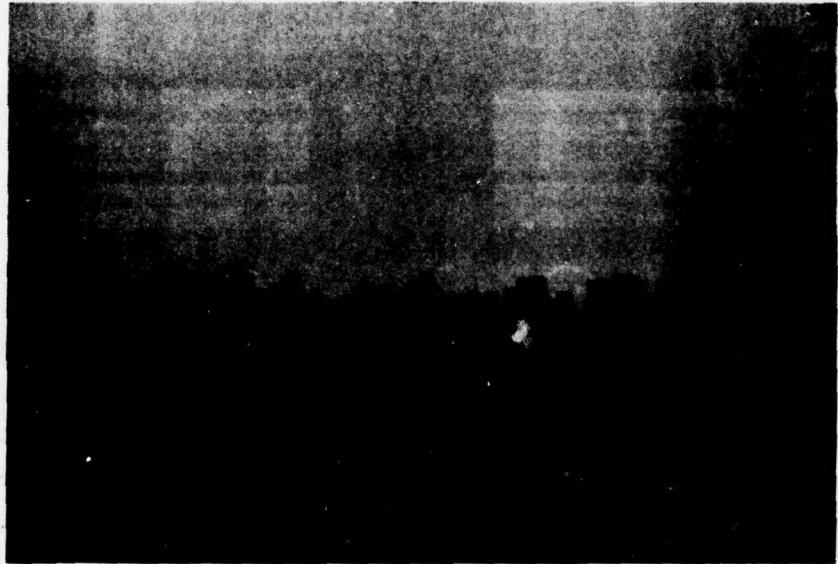

28 July 78


Col. Clark H. Benn
New York District Engineer





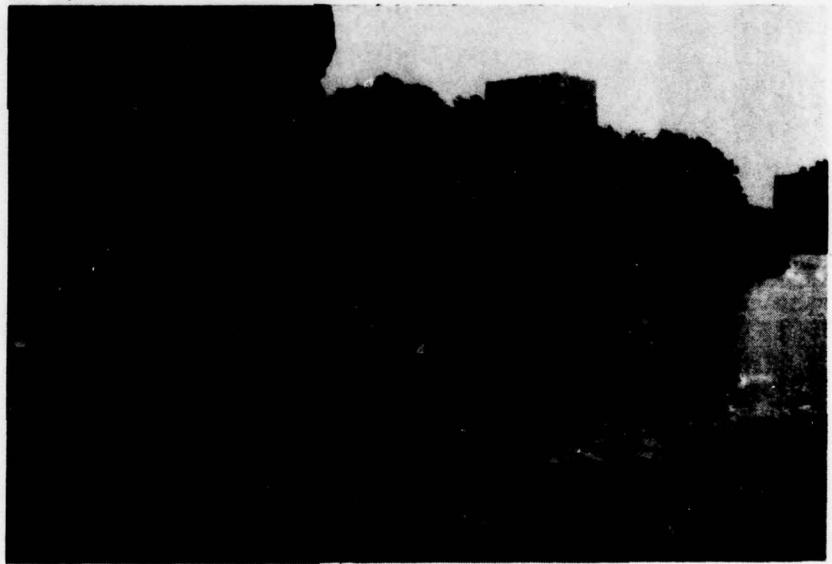
1. View of reservoir looking north through fence from south gate downtime structure (#3).



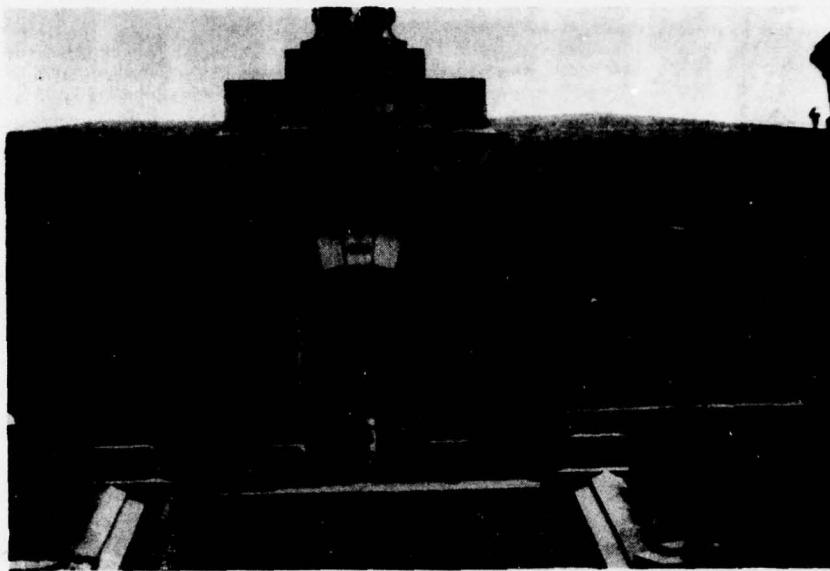
2. View of reservoir looking south from northern intake structure.



3. View along reservoir path at location of intake structure.



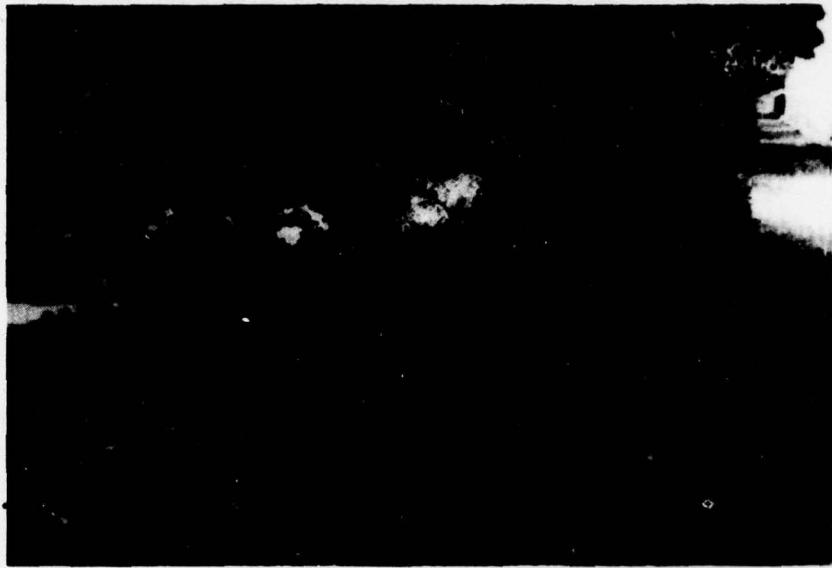
4. Detail of riprap taken from reservoir side of the northern intake structure.



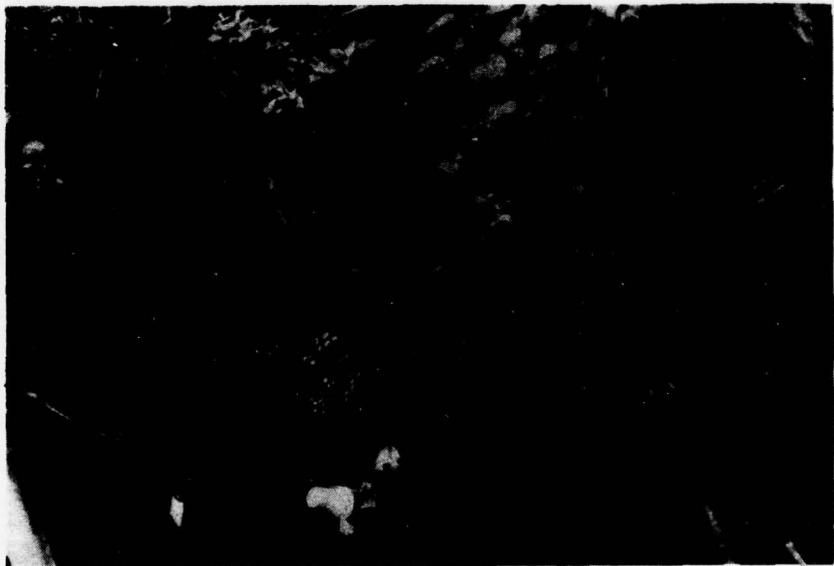
5. Picture of south downtake structure and control center.



6. Detail of overflow weir at structure #3.



7. Typical detail of large trees near top of embankment.



8. Sink hole along access road.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
NAME OF DAM - CENTRAL PARK RECEIVING ID# - NY198

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

a. Authority

Authority for this report is provided by the National Dam Inspection Act, Public Law 92-367 of 1972. It has been prepared in accordance with a contract for professional services between Dale Engineering Company and The New York State Department of Environmental Conservation.

b. Purpose of Inspection

The purpose of this inspection is to evaluate the structural and hydraulic condition of the Central Park Receiving Reservoir and appurtenant structures, and to determine if the dam constitutes a hazard to human life or property and to transmit findings to the State of New York.

This Phase I inspection report does not relieve an Owner or Operator of a dam of the legal duties, obligations or liabilities associated with the ownership or operation of the dam. In addition, due to the limited scope of services for these Phase I investigations, the investigators had to rely upon the data furnished to them. Therefore, this investigation is limited to visual inspection, review of data prepared by others, and simplified hydraulic and structural stability evaluations where appropriate. The investigators do not assume responsibility for defects or deficiencies in the dam or in the data provided.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances

The Central Park Receiving Reservoir is formed by an earth fill embankment with a puddled core wall. This embankment covers the entire perimeter of the reservoir and measures approximately 1.6 miles along the top. The embankment varies in height around the perimeter up to a maximum of approximately 38 feet above original ground. The top width of the reservoir is approximately 15 feet. The reservoir is divided into two basins by a center dividing wall with a top approximately 9 feet below the top of the perimeter embankment. The inside face of the embankment is heavily riprapped from the top of wall to the bottom of the basin. Exterior slopes of the embankment are heavily grown up with trees through most of the perimeter. The reservoir is fed by New York City Water Tunnel

No. 1 and no off-site drainage enters the impoundment. An overflow weir is located at the south gate house. The weir is 6 feet wide with 2 feet headroom and allows overflow to be conducted into the city's storm sewer system. The reservoir may be drained by controlling the gates at the north end of south gate house.

b. Location

The Central Park Receiving Reservoir is located in Central Park in the Borough of Manhattan, New York City, New York.

c. Size Classification

The maximum height of the dam is about 38 feet and the storage capacity is estimated to be 4,013 acre feet. Therefore, the dam is in the intermediate size category as defined by the Recommended Guidelines for Safety Inspection of Dams.

d. Hazard Classification

This facility is located in the center of the Borough of Manhattan. Failure of this structure could cause wide spread damage and loss of life in areas of Manhattan surrounding the reservoir. Therefore, the dam is in the high hazard category as defined by the Recommended Guidelines for Safety Inspection of Dams.

e. Ownership

The reservoir is owned by the Bureau of Water Supply of the City of New York.

f. Purpose of Dam

The dam is used as a receiving reservoir for water supply purposes in the City of New York.

g. Design and Construction History

In 1858, a contract was let for the construction of the Central Park Receiving Reservoir. Accounts indicate that construction was completed in approximately 1862. No information was found to indicate the designer of the reservoir facility. The reservoir has been in constant use since 1863 and has been maintained throughout the years by the Bureau of Water, City of New York.

h. Normal Operational Procedures

No specific relevant operating information has been given. There is an operating staff on the site 24 hours a day. The facility is continually maintained. Drainage of reservoir is by gravity with 80 MGD capacity. In addition, up to 50 MGD can be pumped from the reservoir. In 1977 maximum flow was measured at 72 MGD.

1.3 PERTINENT DATA

a. Drainage Area

The drainage area of the reservoir is approximately 107 acres.
Perimeter of reservoir is 1.5 miles.

b. Discharge of Dam Site

Discharges at the overflow weir are related to the operation of the Croton Aqueduct rather than by rainfall events. There have been no reported historical operating conditions which have endangered the condition of the reservoir or caused overtopping of the embankment. Inflows to the reservoir are controlled by staff personnel stationed at the reservoir and by other personnel at central points in the supply system.

c. Elevation

Top of dam	124.10 feet above MSL
Normal pool	119.4 feet above MSL
Average depth	37.10 feet

d. Reservoir

Length of top of dam pool	2800 feet
Length of normal pool	2700 feet

e. Storage

Top of dam	4013 acre feet
Normal pool	3352 acre feet

f. Reservoir Surface

Top of dam	96+ acres
Normal pool	96 acres

g. Dam

Type - Compacted earth bank.
Length - 1.5 miles in circumference, largely perched above existing terrain.
Height - Varies. High embankment to east and south. High sections about 30 feet above 5th Avenue and 86th Street.
Freeboard between normal reservoir and top of dams - 4.7 feet.
Top width - 16 feet.
Side Slopes - 1-1/2 horizontal to 1 vertical interior and exterior.
Zoning - Compacted earth with clay puddle core.
Impervious Core - Clay puddle.
Grout Curtain - None recorded.

SECTION 2 - VISUAL INSPECTION

2.1 SUMMARY

a. General

The visual inspection of the Central Park Receiving Reservoir in New York City took place on June 22, 1978. The reservoir has undergone a program of continued maintenance over the years. At the time of inspection, divers were working in the north gate house intake structure repairing one of the gates. The reservoir is perched above the existing terrain and has virtually no runoff area above the pool other than the embankment slope.

b. Dam

The reservoir visually conforms to the plans as provided in this report. The reservoir embankment surrounds the impoundment a distance of 1.5 miles. The reservoir is fenced in with a path on the outside of the reservoir area. The path was walked with visual inspection of the impoundment riprap. The riprap was generally in good condition and fairly well maintained and cleared of heavy vegetative growth. The north and west sides of the impoundment approach natural ground elevation contours while the east and south portions have the greatest embankment heights. There are no trees located between the path and the reservoir surface, however, a number of trees exist adjacent to the path on top of the embankment. The exterior slope of embankments has significant tree growth. A number of surface areas had exposed soil. However, there were no significant signs of erosion. The lower portions of high embankment areas were inspected along a service road below the toe of the embankment. No sloughing or significant erosion was observed. One limited size sink hole was located (see photographs included in this report) and the Bureau of Water Supply indicated they were investigating the hole, suspecting it was related to underground utility problems and not dam seepage.

c. Appurtenant Structures

Both the north intake and south downtime structures were visually inspected with no observed problem areas. As previously mentioned, a north intake gate was in repair. The south gate weir overflow was inspected and found to be in service. Flashboards were found in place.

d. Reservoir Area

The reservoir area is completely riprapped and in good condition.

e. Downstream Channel

Overflow from the reservoir enters the city sewer system. The flow into the reservoir is completely controlled via the city's aqueduct system. There is adequate freeboard in the reservoir to contain the probable maximum of rainfall without overtopping.

SECTION 3 - HYDROLOGY AND HYDRAULICS

3.1 EVALUATION OF FEATURES

a. Experience Data

The reservoir is a water supply holding area perched above the surrounding terrain and has only the impoundments interior embankment for runoff, the area of which is only minor. Based on information given by the operations staff, there will be more than sufficient operations freeboard within the reservoir to store a PMP rainfall of approximately 25-30 inches without overtopping the embankment. The only way the reservoir would be overtopped would be an operator error on the aqueduct supply end of the system. Since the reservoir is continually staffed with the reservoir level in continual observation, and with the aqueduct operators in continued radio contact, this possibility seems remote and beyond the scope of this investigation.

SECTION 4 - STRUCTURAL STABILITY

4.1 Evaluation of Structural Stability

a. Visual Observations

The embankment for the entire perimeter of impounded reservoir is in good condition with no indication of misalignment or other structural movement, cracking or significant erosion. Riprap visible on the face of the impounding slopes is generally in good condition although mortar joints are poor at many locations and a light to medium growth of low foliage is occurring. The width across the top of high embankment sections is somewhat variable but is typically on the order of 10 to 15 feet. Downstream slopes of most of the embankment areas have plant growth which includes mature, tall, large diameter trees. No seepage through embankments or below embankment toes was observed.

Uptake and downtime structures are generally in good operating condition. Some repair was ongoing at the time of the inspection.

b. Geology and Seismic Stability

The rock beneath the reservoir is Manhattan Schist which overlies Inwood Marble. Although the schist is a resistant and durable rock, it has been known to weather readily under a condition of excessive water along foliation planes. Such weathering is unlikely to affect the reservoir structure above. However, the marble beneath the schist is susceptible to solution, and thus the possibility arises that solution of the lower marble could lead to subsidence of the schist thereby affecting the reservoir. Such speculation is dependent upon the thickness of the schist, unknown at present, and the degree of "rotted" schist, if any.

As shown on the map, the Manhattanville fault crosses the northeast corner of Central Park. This fault plane dips to the southwest. Two smaller faults are located northwest of the park. The general structural trend of the closely folded metamorphic rock is about N35°E.

Although the seismic probability map indicates the area to be in Zone 1, this map is highly generalized and is not recommended for sophisticated seismic interpretation. The New York State Geological Survey believes this region is more suitably considered as being at least Zone 2. Survey staff considers an earthquake of Modified Mercalli (MM) intensity VII a distinct possibility in this area.

Historically, several earthquakes of varying intensity have occurred in this area: in 1737 (M.M. VII), in 1804 (M.M. III), in 1841 (M.M. III), in 1848 (M.M. V), in 1878 (M.M. V), and in 1939 (M.M. II).

c. Data Reviews and Stability Evaluation

Design drawings indicate an embankment cross section consisting of a puddle core and compacted earth outer sections. The core penetrates to rock underlying the site but the compacted earth shell sections bear on soil. Embankment slopes of 1-1/2 vertical on 1 horizontal are specified, with a riprap of broken stone provided for the impounding face. Top widths of some 15 feet are shown. Information on soil types in the embankment shell, and methods of soil placement and compaction, is not provided. Observable conditions indicate general agreement with the design drawings.

The embankments are in good condition at present. However, the presence of mature large trees at many locations on the outside/downstream slope of embankment sections which are limited in cross-section will provide the opportunity for seepage to commence when root systems eventually penetrate the puddled core wall.

The constructed embankments are in good condition with no indication of structural damage or distress from past loadings including effects of at least one minor area earthquake. This site is in an area having a Seismic Zone rating of 1 (with a suggested upgrading to Zone 2), and convention assumes no earthquake hazard. It is anticipated that, properly maintained, this reservoir will continue to serve satisfactory for loading conditions which are similar to those of the past.

SECTION 5 - ASSESSMENT/REMEDIAL MEASURES

5.1 DAM ASSESSMENT

On the basis of the Phase I visual examination, the earth embankment of the Central Park Receiving Reservoir appears to be adequate for normal reservoir operation. The location of this facility in the center of Manhattan makes the detection of any seepage problems almost immediate. At the time of the Phase I inspection, a settlement had occurred on the northeast side of the reservoir in the service road which encircles the reservoir. This settlement shows no evidence of any water seepage. Its cause remained unknown at the conclusion of the inspection. The outer face of the embankment forming the reservoir is heavily grown up with trees and brush. These trees are relatively large and have been in place for a number of years. Pedestrian traffic down the slopes of the embankment has deteriorated the turf so that minor erosion occurs in some areas.

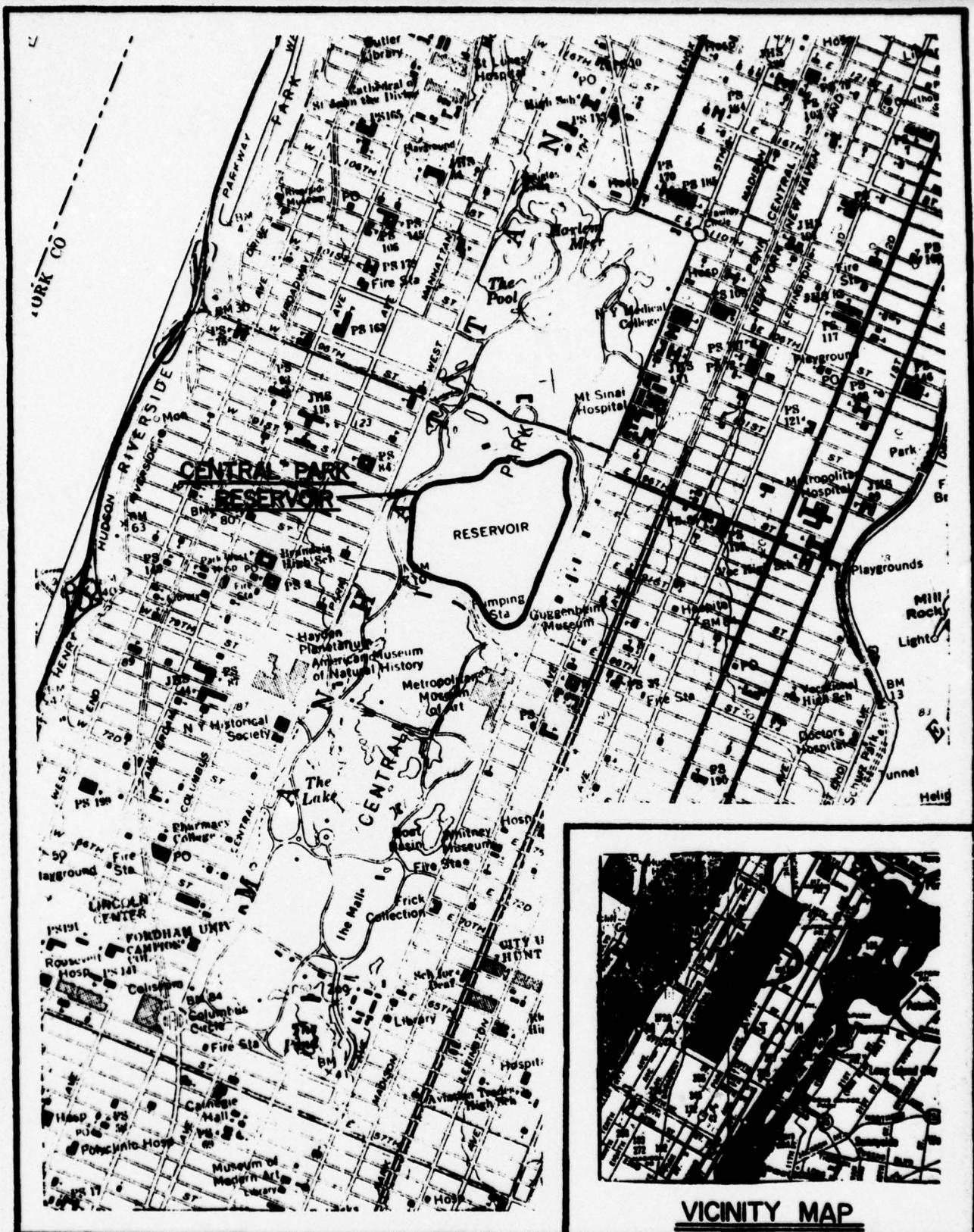
5.2 REMEDIAL MEASURES

a. Alternatives

The investigation of the cause of the settlement in the bridle path should be pursued and remedial work taken as necessary. Trees, stumps and brush should be removed from the exterior slopes of the embankment. Continuing maintenance should be conducted around the perimeter of the reservoir to minimize erosion of the downstream slopes.

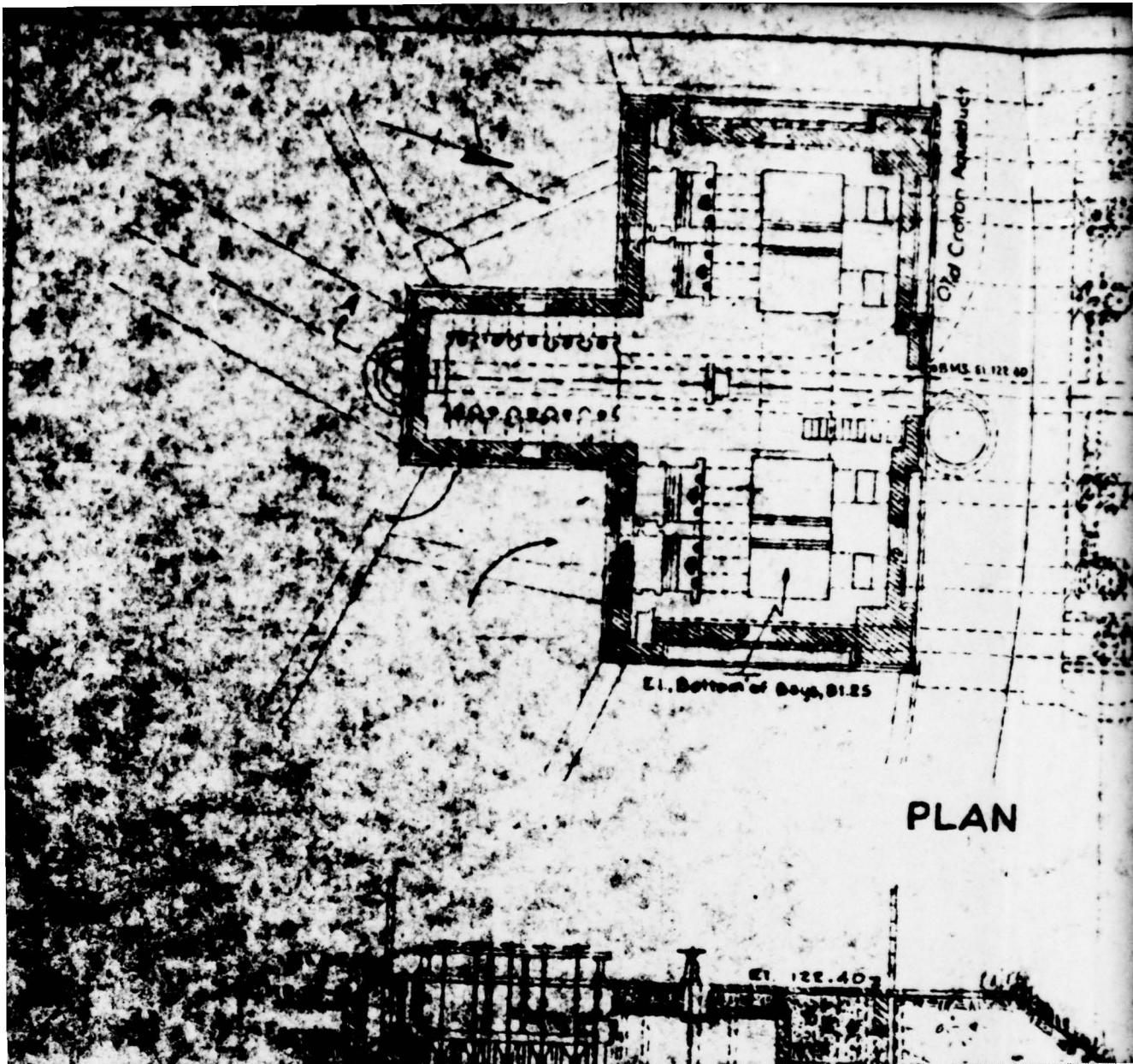
b. Operation and Maintenance

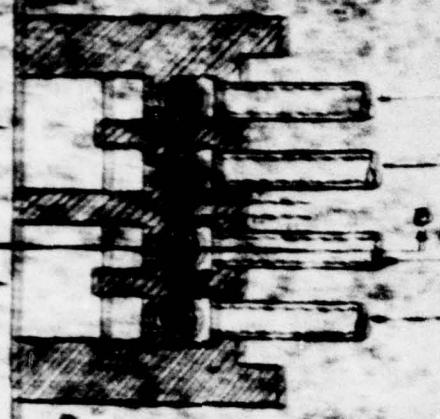
No specific relevant operating information has been given. There is an operating staff on the site 24 hours a day. The facility is continually maintained.



LOCATION PLAN

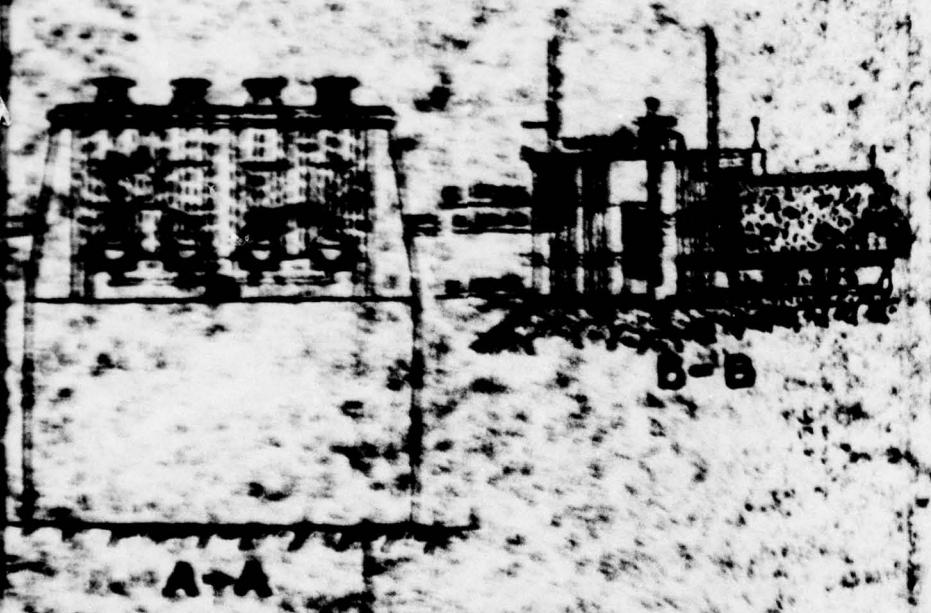
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45° Inclined
Pipes

PLAN



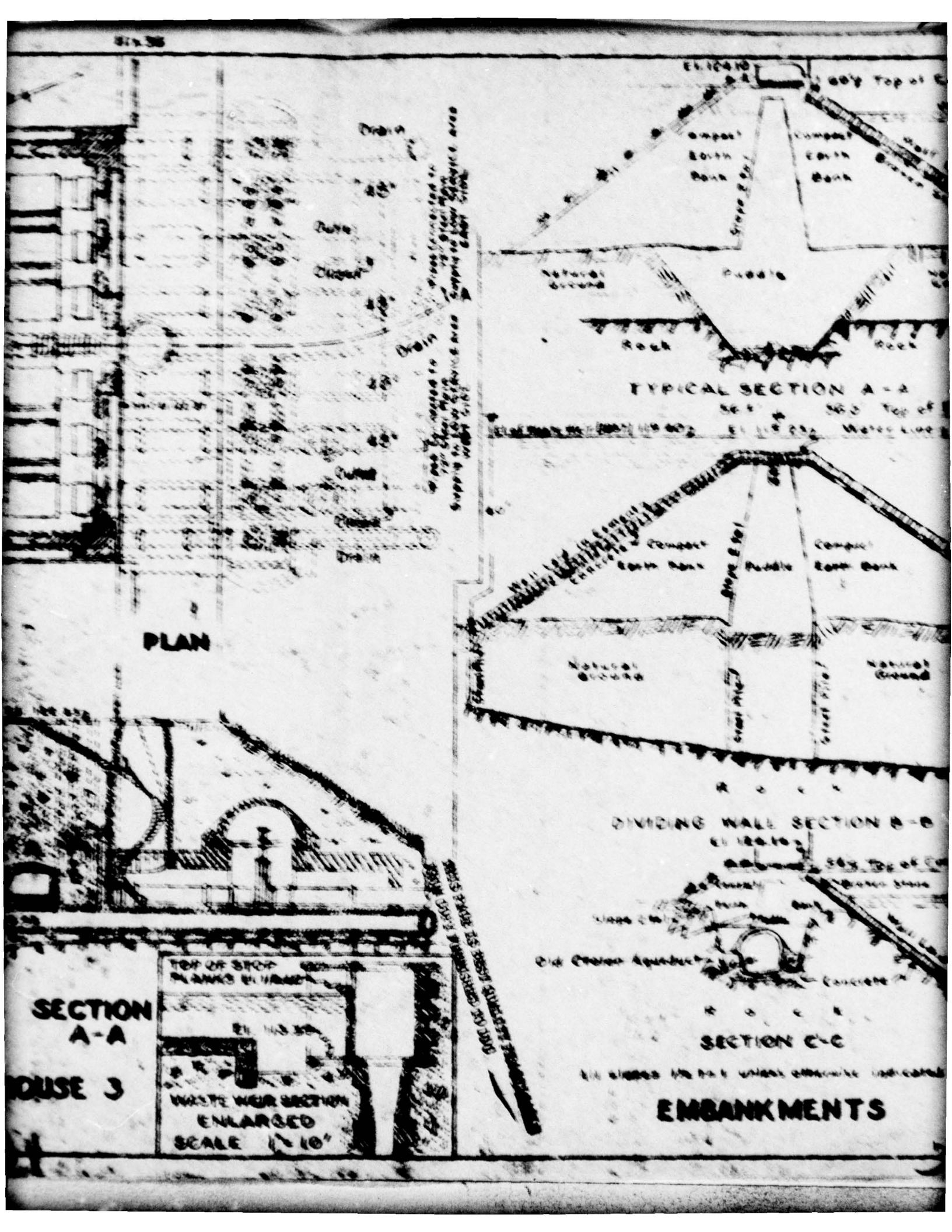
SECTIONs

GATE HOUSE 2

GATE



03-20



of Embankment 3 El. 142.30

Water Line 2 El. 119.40

40'

Natural Ground

El. 87.30

of Embankment 2 El. 122.30

40'

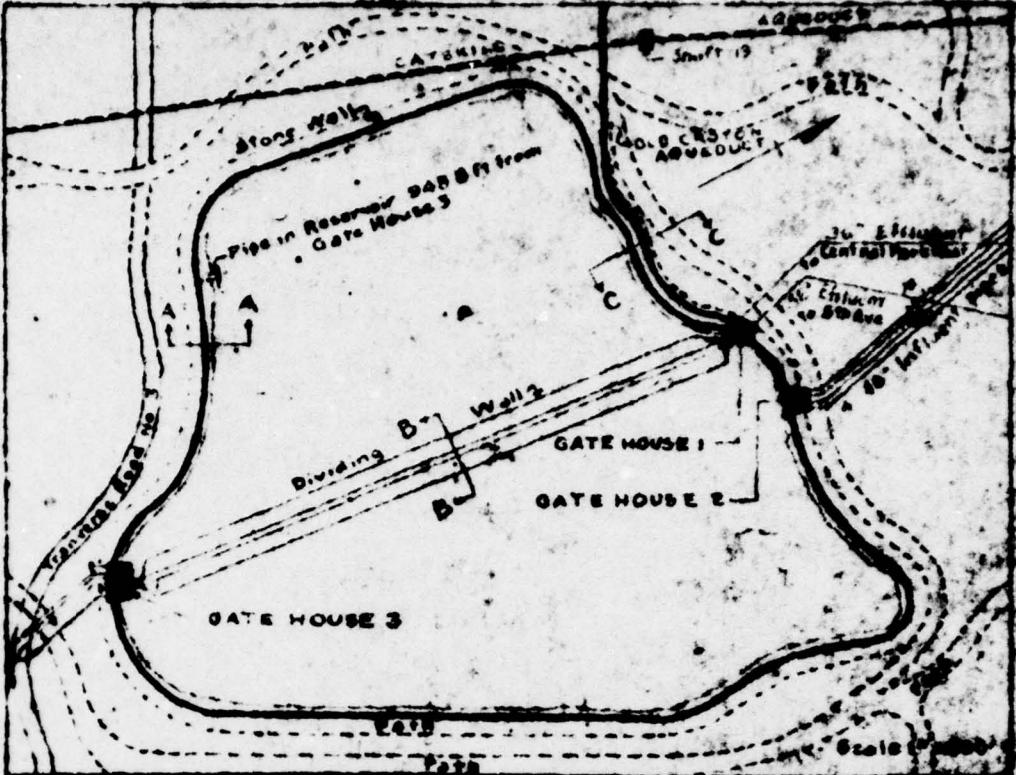
El. 82.30

Embankment 1 El. 122.30

Water Line 1 El. 119.40

36'

El. 86.30



LIST OF ELEVATIONS
DATUM, MEAN SEA LEVEL, AT SANDY HOOK

DESCRIPTION	ELEVATION	DESCRIPTION
GATE HOUSE 1		GATE HOUSE 3
B.M. 3 Brass knob, 10° W of door	122.48	GATE HOUSE 3, 15° W of door
Floor of Gate House	122.60	Pig Iron Gate House
Bottom of Boys	121.25	Floor of Reservoir
Top of Gate Slides	116.40	Reservoir Spillway
Bottom of North Bay	109.46	Bottom of Boys
Flood platform over Spillway	120.07	Bottom of Drainage Shaft
Spillway, Top Step	119.43	
Spillway, Bottom Step	118.37	
GATE HOUSE 2		MISCELLANEOUS
B.M. 3 Brass knob, 5 M. Cor railing base	126.88	Wall, typical Section
Floor of Gate House, grating	126.86	Wall, containing Aqueduct
Dividing Wall	122.86	Dividing Wall
Top of Arch. inlet to Res.	119.48	
Invert of Influent Pipes	109.59	
Bottom of Boys	109.45	

INFORMATION FROM BRASS PLATES IN GATE HOUSES 1 & 3

Construction began April 18, 1858 Area (probably includes embankments) 106 1/2 Acres.
 Water first introduced Aug. 19, 1862 Capacity 1,000,000,000 Gals.

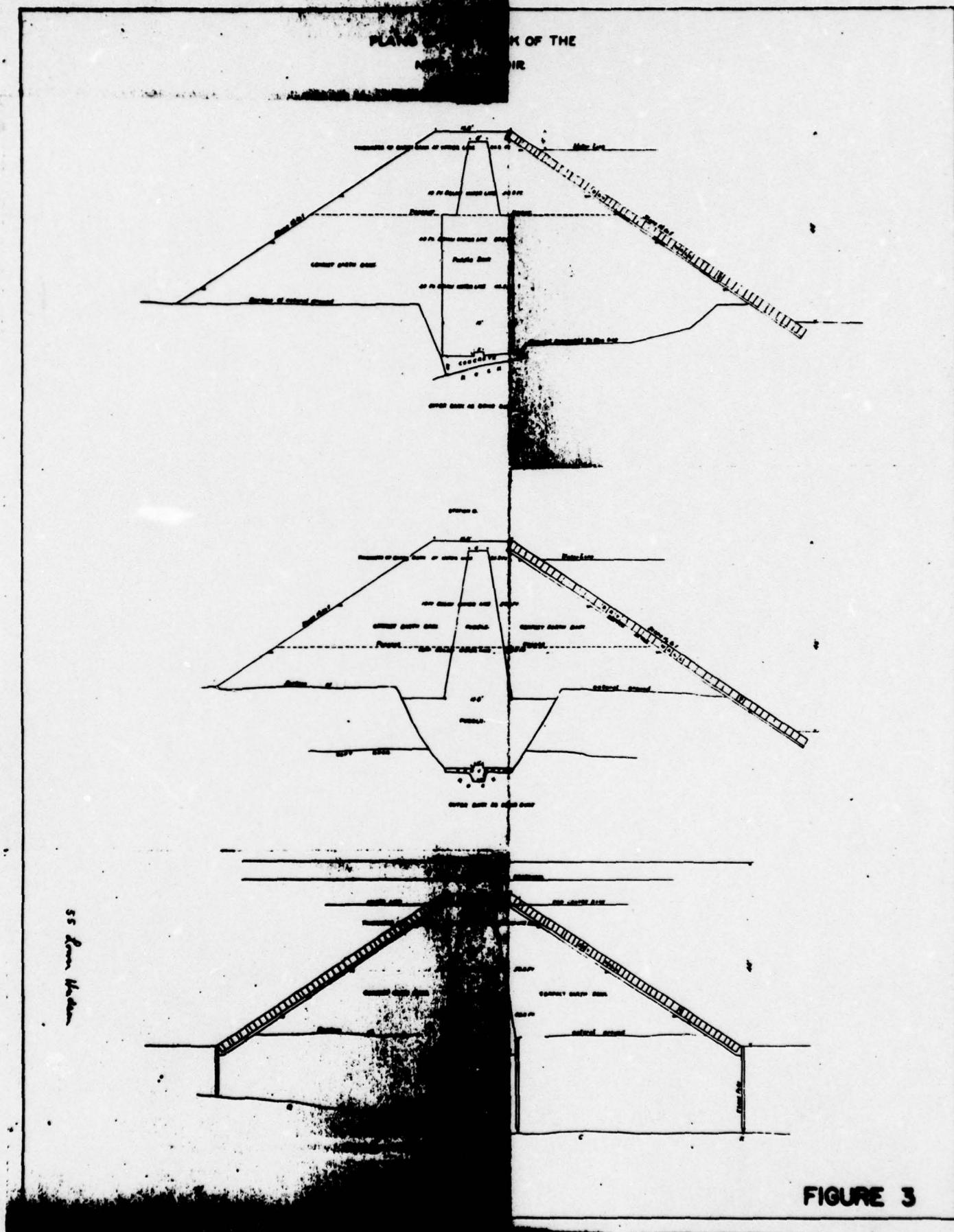
OTHER INFORMATION

Area of Water Surf at el. 119.40: 96 Acres. Capacity, water at el. 119.40 1,010,000,000 Gals.
 Average Depth 37.10 Feet Perimeter of stone wall 1.6 Miles.

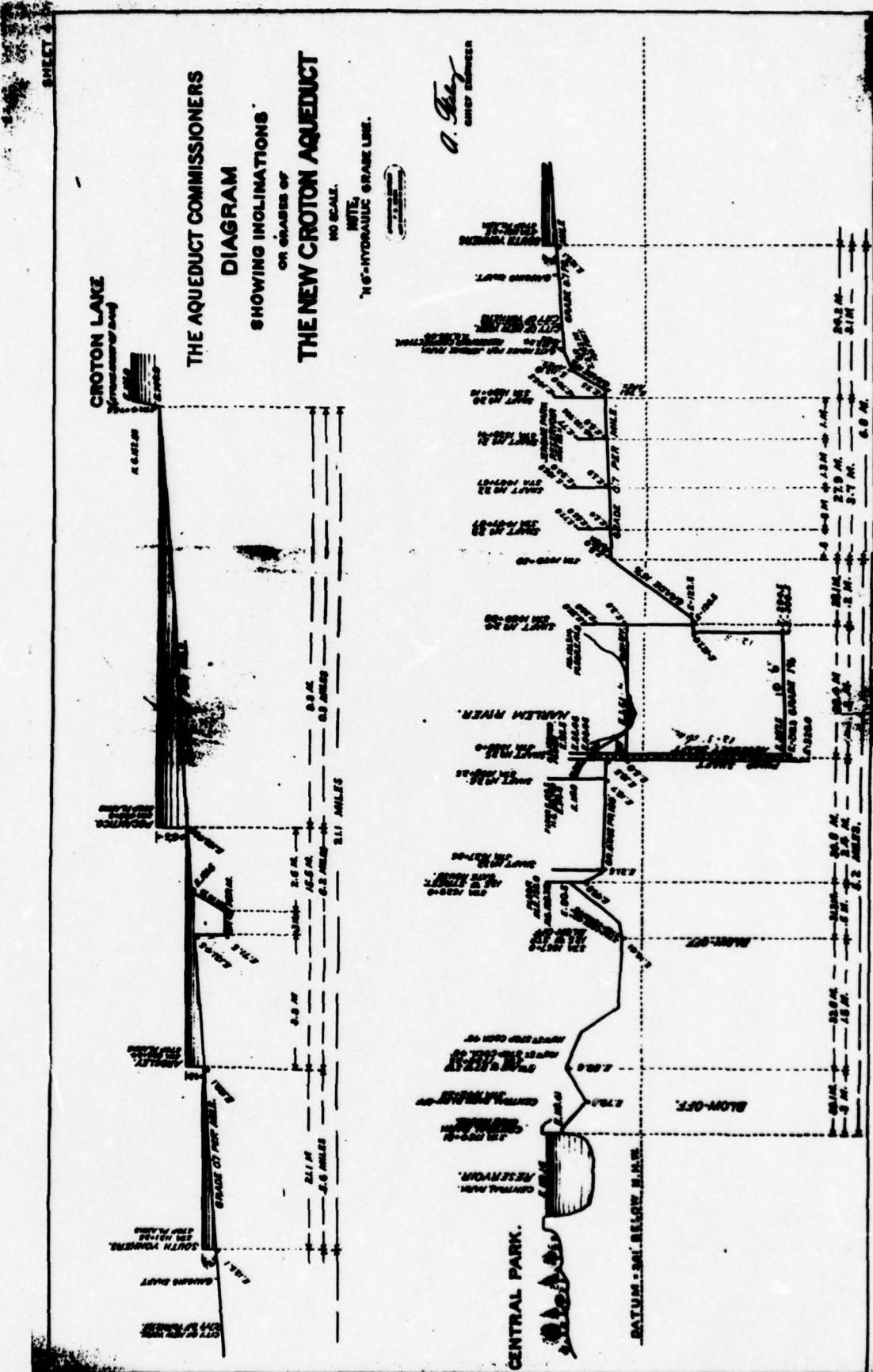
CITY OF NEW YORK
DEPARTMENT OF WATER SUPPLY GAS & ELECTRICITY

**GATE HOUSE SUBSTRUCTURES
CENTRAL PARK RESERVOIR**

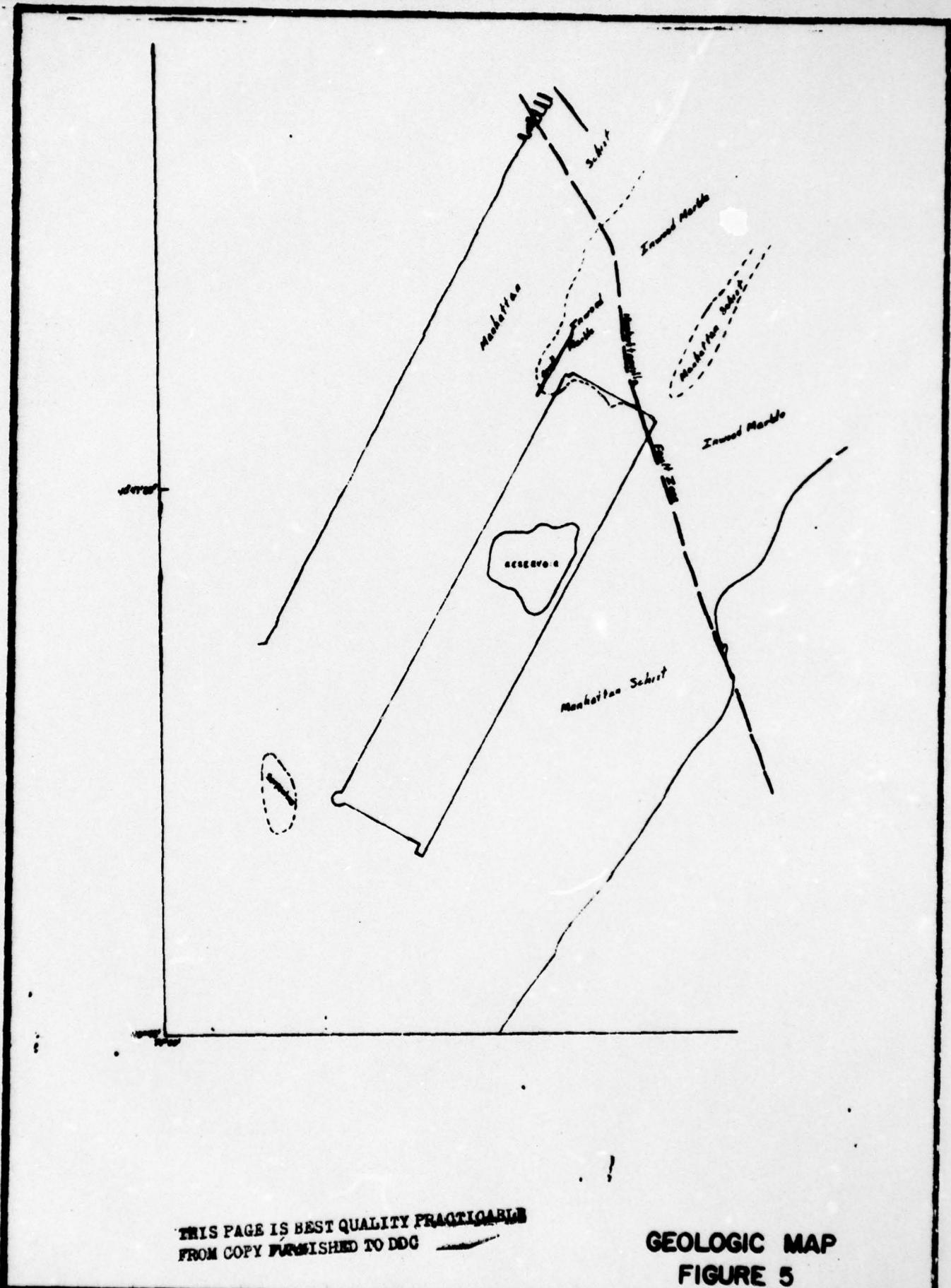
BOROUGH OF MANHATTAN
MAY 1937 - SCALE - 1 INCH = 50 FEET



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GEOLOGIC MAP
FIGURE 5

APPENDIX A
FIELD INSPECTION REPORT

CHECK LIST
VISUAL INSPECTION

PHASE 1

Name	Dam	Central Receiving Reservoir	County	New York	State	New York	ID #	198
Type of Dam		Earthen Reservoir			Hazard Category	1		
Date(s)	Inspection	June 22, 1978	Weather	Cloudy		Temperature	70°	

Pool Elevation at Time of Inspection 116.5 M.S.L. Tailwater at Time of Inspection Not applicable.
(Reservoir is a closed water supply system)

Inspection Personnel:

<u>N.F. Dunlevy</u> - Company	Dale Engineering	<u>James Hennessey</u> , Deputy Engineer, Bureau of Water Supply
<u>F.W. Byszewski</u> - Company	Dale Engineering	<u>Stanley Goldstein</u> , N.Y.C. Bureau of Water Supply
<u>D. McCarthy</u> - Company	Dale Engineering	<u>William Melnichuk</u> , N.Y.C. Bureau of Water Supply

Neal F. Dunlevy Recorder

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
ANY NOTICEABLE SEEPAGE	N/A	
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	N/A	
DRAINS	N/A	
WATER PASSAGES	N/A	
FOUNDATION	N/A	

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	N/A	
STRUCTURAL CRACKING	N/A	
VERTICAL & HORIZONTAL ALIGNMENT	N/A	
MONOLITH JOINTS	N/A	
CONSTRUCTION JOINTS	N/A	
STAFF GAGE OF RECORDER	N/A	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	None observed. Reservoir impoundment faced with concrete capped riprap.	Embankment 1.6 miles in circumference. Embankment slope mainly to east and south side.
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE		Unusual hole beyond toe on northeast side of reservoir on extreme side of service road. The hole was 3' in diameter and 2-3 feet deep. N.Y.C. suspects main break & will investigate.
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	None observed.	
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST		Reservoir topped with path and fenced. Top of reservoir is serpentine shaped. No unusual movement observed.
RIPRAP FAILURES		None observed. Some growth in riprap. Vegetative growth is usually cleared annually.

EMBANKMENT

<u>VISUAL EXAMINATION OF</u>	<u>OBSERVATIONS</u>	<u>REMARKS OR RECOMMENDATIONS</u>
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	No abutment. Perched reservoir. Junction of toe of embankment with natural terrain showed no unusual movement or seepage.	
ANY NOTICEABLE SEEPAGE	None observed.	
STAFF GAGE AND RECORDER	None.	
DRAINS	None.	

UNGATED SPILLWAY

VISUAL EXAMINATION OF		OBSERVATIONS	REMARKS OR RECOMMENDATIONS
OVERFLOW WEIR		Good condition.	In downtime structure, consists of a masonry weir with flash boards. Dimensions 6 feet wide with 2-foot opening.
APPROACH CHANNEL		None.	Reservoir
DISCHARGE CHANNEL		Not observed.	Discharges into downtime structure; flows into storm drains.
BRIDGE AND PIERS		None.	

GATED SPILLWAY
WATER SUPPLY INTAKE AND DOWNTAKE

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	Intake and downtake structures in working order. Maintenance was being performed on an intake leaky gate.	Supply from Jerome Reservoir to 135th St under pressure. Then via pipe and aquaduct into reservoir by gravity.
APPROACH CHANNEL	Submerged; not visible to observe.	Peaks at 50 MGD pumped plus 80 MGD gravity Max. 1977 72 MGD
DISCHARGE CHANNEL	Submerged; not visible to observe.	None.
BRIDGE AND PIERS		Reportedly in working order. Full time operating personnel at site.
GATES AND OPERATION EQUIPMENT		Intake gate being repaired by divers at time of inspection as part of routine maintenance and repair.

OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	Not observed.	Outlet works in reservoir. Supply gravity fed water supply to structures in Manhattan with 40 feet or less of head.
INTAKE STRUCTURE	Not observed.	
OUTLET STRUCTURE	Not observed.	
OUTLET CHANNEL	Not observed.	
EMERGENCY GATE	Not observed.	

DOWNSTREAM CHANNEL

<u>VISUAL EXAMINATION OF</u>	<u>OBSERVATIONS</u>	<u>REMARKS OR RECOMMENDATIONS</u>
<u>CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)</u>	Not applicable.	Perched reservoir would flood over embankment or through breech.
<u>SLOPES</u>	Not applicable.	In case of breech or overflow of embankment, maximum head is to the south and east.
<u>APPROXIMATE NO. OF HOMES AND POPULATION</u>		Highly urbanized. Midtown Manhattan 5th Ave. between 85th & 94th Streets.
		Damage and/or potential loss of life in case of a breech is great.

INSTRUMENTATION

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None.	
OBSERVATION WELLS	None.	
WEIRS	None.	Overflow weir could be monitored.
PIEZOMETERS	None.	
OTHER	None.	

RESERVOIR

<u>VISUAL EXAMINATION OF</u>	<u>OBSERVATIONS</u>	<u>REMARKS OR RECOMMENDATIONS</u>
<u>SLOPES</u>	None.	Reservoir perched above adjacent ground on all sides.
<u>SEDIMENTATION</u>	None.	Only treated water gets into reservoir.

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE 1

NAME OF DAM Central Receiving Reser
 ID # 198

ITEM	REMARKS
AS-BUILT DRAWINGS	None.
REGIONAL VICINITY MAP	See this report.
CONSTRUCTION HISTORY	Limited data available. See this report. Other information can be found in books on N.Y.C., Central Park and from data at N.Y.C. Bureau of Water Supply.
TYPICAL SECTIONS OF DAM	See this report.
OUTLETS - PLAN - DETAILS - CONSTRAINTS - DISCHARGE RATINGS	See this report.
RAINFALL/RESERVOIR RECORDS	Available for N.Y.C. area.

ITEM	REMARKS
DESIGN REPORTS	Little or no information available. None were found and included in this report.
GEOLOGY REPORTS	Limited data. See this report.
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	None.
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	None.
POST-CONSTRUCTION SURVEYS OF DAM	None.
BORROW SOURCES	Not known.

ITEM	REMARKS
MONITORING SYSTEMS	None. City can determine inflow and outflow.
MODIFICATIONS	None.
HIGH POOL RECORDS	Generally not available. Records could be researched from daily records.
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	None available or disclosed for this report.
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	None disclosed.
Maintenance operation, records	See N.Y.C. Bureau of Water Supply.

ITEM	REMARKS
SPILLWAY PLAN	Not applicable.
SECTIONS	
DETAILS	
OPERATING EQUIPMENT PLANS & DETAILS	See this report for general information.

CENTRAL PARK RECEIVING DAM

CHECK LIST
HYDROLOGIC & HYDRAULIC
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: None (Water supply fed by N.Y.C. Croton System)
(Pool area - 95 acres)

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 119.0

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): 119.0

ELEVATION MAXIMUM DESIGN POOL: 122.30

ELEVATION TOP DAM: 124.14 (1.6 miles around)

CREST: Overflow weir in Gate House #3 (see Plans)

- a. Elevation 119.40 top of planks, 113.39 top of wier
- b. Type Masonry Weir (planks in use)
- c. Width 18-24 inches, masonry; 4 inches, planks
- d. Length 72 inches
- e. Location Spillover Below Gate House #2
- f. Number and Type of Gates 1

OUTLET WORKS: (Drawdown Facility)

- a. Type 60-inch pipe
- b. Location Below Gate House #3
- c. Entrance Inverts 113.39 to 119.40 w/planks
- d. Exit Inverts 77.00 feet scaled
- e. Emergency Draindown Facilities

HYDROMETEOROLOGICAL GATES:

- a. Type None
- b. Location None
- c. Records None

MAXIMUM NON-DAMAGING DISCHARGE: Not applicable. Inflow controlled by N.Y.C. Water Board Operation.

OTHER DATA:

- a. Reservoir is a storage reservoir. It supplies water in Manhattan with head requirements below 40 feet fed by gravity.
- b. Additional pump out capacity of 50 MGD.
- c. Daily flow capacity is 80 MGD by gravity.
- d. Storage 35,000,000 gallons per foot.
- e. Eight-year peak 72 MGD.

APPENDIX B
PREVIOUS INSPECTION REPORTS

STATE OF NEW YORK

DEPARTMENT OF

Chair Engineer and Surveyor

ALBANY

Report of a Structure Impounding Water

In pursuance of the provisions of Section 22 of the Conservation Law, being Chapter LXV of the Laws of the State of New York, relating to safeguarding life and property and the erection, reconstruction, enlargement, or maintenance of structures for impounding water, owners of such structures are requested to fill out as completely as possible the report form for each such dam or reservoir owned within the State of New York for which no plans or description of the structure are on file in this Department, and to return this report form, together with prints or photographs of the structure, if any, thereto to this department.

The New Central Park Receiving Reservoir.
The structure is in Central Park..... BOROUGH OF..... Bronx
METHOD OF CONSTRUCTION..... ICING..... and

(Indicate the source of water and direction from a well-known bridge, dam, village main cross-roads or mouth of a stream)

Is the structure built upon or does its pond flood any State lands?..... NO
The name and address of the owner is..... City of New York

The structure is used for receiving & distributing water for water supply.....
The structure is built out of the right bank, in the direction with the current, is.....; at the
bottom of the structure the material has a top slope of..... inches vertical to a foot horizontal on the
bottom of the structure, a vertical thickness at this elevation of..... feet, and the top surface extends
to a height of..... feet above the spillway crest.

The material of the left bank is.....; has a top slope of..... inches
vertical to a foot horizontal on the left bank, a thickness of..... feet and a height of..... feet.

The material of the bed on which the structure rests is (clay, sand, gravel, boulders, granite, shale, etc.).....
The character of the bed and the banks in respect to the hardness, perviousness, water bearing, etc.,
and the relation of the bed to water, uniformity, etc.,.....

The reservoir was constructed by excavation and embankment. It is
completely watertight.

9. If the bed is in layers, are the layers horizontal or inclined?..... If inclined what is the direction of the horizontal outcropping relative to the axis of the main structure and the inclination angle?.....

10. What is the thickness of the layers?.....

11. Are there any porous seams or fissures?.....

12. The watershed at the above structure and draining into the pond formed thereby is..... square miles.

13. The pond area at the spillway crest elevation is..... 96..... acres and the pond impounds..... 133,600 cubic feet of water.

14. The maximum known flow of the stream at the structure was..... cubic feet per second.

(Date)

15. Has the spillway capacity ever been exceeded by a high flow?..... no.....

Can any possible flood flow from the pond otherwise than through the wastes noted under 17 and 18 of this report?..... no..... If so, give the location, the length and the elevation relative to the spillway crest and the character and slopes of the ground of such possible wastes.....

16. State if any damage to life or to any buildings, roads or other property could be caused by any possible failure of the above structure. Describe the location, the character and the use of buildings below the structure which might be damaged by any failure of the structure; of roads adjacent to or crossing the stream below the structure, giving the lowest elevation of the roadway above the stream bed and giving the shape, the height and the width of stream openings; and of any embankments or steep slopes that any flood could pass over. Mention the character and use made of the ground below the structure.....

If the reservoir should fail, the neighboring streets would be flooded.....

see opposite page.

17. WASTES. The spillway of the above structure is..... feet long in the direction held at the right end by a..... the top of which is..... feet above the spillway crest, and has a top width of..... feet; and at the left end by a..... the top of which is..... feet above the spillway crest, and has a top width of.....

18. There is also for flood discharge a pipe..... inches inside diameter extending..... feet below the spillway crest; and a (sluice, gate outlet)..... feet wide by..... feet high, and the bottom is..... feet below the spillway crest.

Answer. Below the spillway there is an apron built of.....
..... feet thick. The downstream side of the apron has a thickness of..... feet
..... feet.

..... structure any weaknesses which are liable to cause its failure in high flows?.....

No.

Answer. On the back of this report make a sketch to scale for each different cross-section of the above structure, giving the greatest depth; giving the height and the depth from the surface of the foundation, the bottom width, the top width, the thickness, the material of the apron (if a concrete or masonry spillway at two feet below the crest), the elevation of the top in reference to the crest, the length of the section, and the material of which the section is constructed; on the spillway sketch the cross section of the apron, giving its width, thickness and material, and show the abutment or wash of the spillway, giving its heights and thickness. Mark each section with a capital letter. Also sketch the above sections by their top lines, giving the mark and the length of each; the openings by their dimensions; the abutments by their top width and top lengths from the upstream face of the spillway to the outline of the apron. Also sketch an elevation of each end of the structure with a cross section of the depth and width excavated into the banks.

Answer. WATER SUPPLY. The waters impounded by the above structure have not been used for a public water supply since 1862..... by.....

The City of New York

Answer. The reservoir is divided into an East and West Basin by a central division wall. An inlet gatehouse constructed at the north end and an outlet gate-house at the south end of the reservoir.

The maximum depth of the water in the reservoir is 38 feet.

A waste-passage, 2 by 6 feet is formed on the top of the central wall, where it forms the south gate-house.

A 4-foot culvert conveys the waste-water to the 86th St. sewer.

Profiles of dams of the New Central Park Reservoir, etc., etc.,
and hereto.

The above information is correct to the best of my knowledge and belief.

Municipal Building, New York
(A.G.C. - Engineer)

February-1925.

(Date)

Chief Engineer-Bureau of Water Supply

(A person signing for me certifies that the above is correct)
Dept. of C. C. C.

APPENDIX C
REFERENCES

APPENDIX

REFERENCES

1. Edward Wegmann: The Design and Construction of Dams, John Wiley and Sons (1918)
2. Charles H. Weidner: Water for a City - Rutgers University Press (1974)
3. The University of the State of New York - The State Education Department - State Museum and Science Service - Geological Survey: Geological Map of New York (1961)
4. James C. Duane: Report to the Aqueduct Commission 1887-1895 (1895)
5. John F. Cowan: Report to the Aqueduct Commission 1895-1907
6. Department of the Army, Office of the Chief of Engineers. National Program of Investigation of Dams; Appendix D: Recommended Guidelines for Safety Inspection of Dams, 1976
7. Linsley and Franzini: Water Resources Engineering, Second Edition, McGraw-Hill (1972)
8. Sherard, Woodward, Gizienski, Clevenger: Earth and Earth - Rock Dams, John Wiley and Sons, Inc., 1963
9. Ven Te Chow: Handbook of Applied Hydrology, McGraw-Hill, 1964